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nothing else to do, but they show a very healthy development among a body of men who can more than hold the balance of moral and social power in the world, if only they have the knowledge on the one hand, and the courage on the other, to improve their opportunities.

Christianity in its inception was a moral and social reform, and not a body of dogmatic and traditional beliefs about either the past or the future. The foremost of the ministry are beginning to see this, and to return to the original conception of it, by what one author candidly though forcibly admits to be "in one sense a *backward* movement." Much is to be hoped for in this tendency, and it is worth recording here as a generous welcome to those who can appreciate the force and value of scientific truth, abandon their diatribes against science, and fall into line with the inevitable course of history, which usually has an optimistic outcome, unless nature has to avenge itself for the systematic pursuit of error and wrong.

The volume under notice consists of the 'Vedder Lectures' at New Brunswick Theological Seminary; and the keynote to the discussion is well expressed in the reason assigned for the present revolutionary tendencies, that "the actual inequality of possessions is regarded by the great mass as standing in direct opposition to the generally acknowledged equality of the individual rights of all men." In former times men did not have their equality or their rights admitted, and hence neither arguments nor force could avail to defend them. The author shows from Bockh that three-fourths of the population of Greece were excluded from the benefit and protection of the law; from Gibbon that one-half the population of Rome consisted of slaves, and that not more than 13.5 per cent of the population of Attica possessed real estate. The concentration of power which such a system required was enormous, and no wonder the liberation of the masses from its abuse is accompanied with alarming symptoms. But it is a pleasure to see the ministry recognizing the scientific methods of studying such facts, and not relying upon their speculations about baptism, inspiration, and the trinity to regenerate society. The author wisely treats socialism, whether legitimate or not, as an effect, a phenomenon to be accounted for, something having a cause for its existence, and not to be gotten rid of until its causes were removed. True to his profession, the views of the Old and New Testaments upon property are briefly outlined and candidly handled; but he frankly admits that "any attempt to construe out of passages of the New Testament a specific Christian idea of *property*, will always fail." This is not to exclude ethical from all relation with economical questions. It is acknowledged that we must reckon with the selfish instincts of human nature in all schemes of social government, at least until those instincts are modified. The discussion of the principles of Ricardo and the so-called 'Manchester school' is fair; and more is sympathetically narrated of Proudhon, Fourier, Karl Marx, Lasalle, Louis Blanc, and the whole history of socialistic movements, than most men of theological propensities have the will to read. But there is no disposition to espouse the vagaries of those men, although their agitation and beliefs receive the acknowledgment of being scientific facts which have to be studied.

The solution of the problem is a very good chapter, as admitting the place of ethical considerations along with economical in deciding the issue of the question. Here the author has the opportunity for urging the Christian aspects of the case, which is done in a way quite foreign to the usual homiletic method. It is made a purely scientific question of ethics and political economy. We cannot agree with him, however, that the socialism which he condemns has its support in atheism, and must be destroyed by uprooting the latter. It is a re-action against the traditional method of solving social and moral problems. The age of authority is past, and nothing but facts with reasoned scientific truth based upon them can meet the exigencies of the case. Atheism has its evils, but it will be harder to overthrow this than the system of socialism.

Brief Institutes of General History. By E. BENJAMIN ANDREWS. Boston, Silver, Rogers, & Co. 12°.

WE do not remember having seen any book which is of so much service to the advanced student of general history as this. As a guide to *seminar* work in history, it would be of the greatest value. It is dedicated to Professor Todl of Breslau, whose 'Geschichte

der Ethik' is well known to our students of philosophy; and there is no lack of congruity between the work itself and its dedication to a philosopher, for it is eminently philosophical, both in scope and in treatment. Professor Andrews calls his book a 'precipitate of general history,' and this describes it excellently. It is not an outline, and it is not a skeleton, but 'precipitate' seems to us a very happy designation.

The body of the work falls into eleven chapters, the first dealing with history and the study of history, and the last with Prussia and the New Empire. Each chapter is subdivided into short sections or paragraphs, and each of the latter is accompanied by bibliographical references of great minuteness and accuracy. In this way the student is enabled to hunt down any particular period or episode with great ease, and post himself fully before proceeding. Then each chapter is preceded by an elaborate and more general bibliography, the preparation of which shows wide reading and scholarly research.

The full value of Professor Andrews's volume cannot be appreciated by a cursory examination. We are sure that its excellence of arrangement and treatment will be seen best when it is in use. As a guide to the scientific study of history, or as a skeleton for *seminar* work, it is not surpassed by any book in the language.

Nystrom's Pocket-Book of Mechanics and Engineering. Revised by W. D. MARKS. Philadelphia, Lippincott. 24°.

AS the author remarked in his first preface, every engineer should make his own pocket-book, as he proceeds in study and practice, to suit his particular business. This work was accumulated in this way during the author's professional career, and was first placed before the public in 1854. The reviser has principally confined himself to corrections in the original text, but has added an elementary article on dynamic electricity, and also one on the expansion of steam; and in notes the reviser has taken occasion to express some differences of opinion, and has referred to the literature of topics which required more space than can be given to them in a pocket-book.

Elements of Analytical Mechanics. By PETER S. MICHIE. New York, Wiley. 8°.

THIS volume, as the preface states, is a revised edition of the text taught to the cadets of the United States Military Academy during the session of 1886-87. Together with a brief chapter on hydrodynamics, it is intended to comprise a four-months' course of instruction for students well versed in elementary mathematics. The subjects treated of, after the elementary chapters on matter, force, motion, the physical units, stresses and motive forces, and gravity, are those usually taken up in a treatise on this subject. The book closes with a theory of machines. The arrangement of the subject-matter, and method of treatment adopted, are such as have received the approval of several able scientific officers who have been associated with the author in the instruction of cadets.

On the Conversion of Heat into Work. By WILLIAM ANDERSON. New York, Van Nostrand. 12°.

THE Council of the Society of Arts invited the author of this work to deliver a course of lectures upon the conversion of heat into useful work; and these lectures, which form the basis of the present work, were delivered in the winter of 1884-85. The object of the lectures was to popularize the doctrine that in heat-engines the work given out is due to the conversion of the molecular motion of heat into the visible motion which it was desired to produce, and further to illustrate, by numerous practical examples, the applicability of the doctrine of Carnot to defining the limits within which improvement in the economical working of heat-engines was possible. In the hope of making the modern views with respect to the action of heat more real and practical, the author adopted the method of working out his investigations by means of numerical examples, and comparing the results with those obtained in actual practice. All those who are interested in the elementary instruction

of physics will find this book an extremely valuable aid, and full of suggestions. The chapters on other forms of heat-engines besides the ordinary steam-engine tend to make the subject more interesting, and place in the hands of the teacher a vast amount of important information.

The Elements of Qualitative Analysis. By WILLIAM A. NOYES. Terre Haute, Ind., Moore & Lanzen. 12°.

PROFESSOR NOYES'S little book on qualitative chemical analysis is a very brief and highly condensed account of ordinary modes of proceeding in qualitative analysis of a simple kind, and the reasons therefor. Of the properties of the elements considered, only such are discussed as are immediately applicable to the scheme of analysis, though the deficiency in this respect is supplied to a certain extent in the table of re-actions, for which the author acknowledges indebtedness to Biedermann's 'Chemiker-Kalender' for 1887. Of course, such a book may serve profitably as the foundation merely, upon which the judicious instructor erects the superstructure of his teaching, and for such use it will doubtless find place. It is clearly written and well arranged.

Elements of Modern Chemistry. By ADOLPHE WURTZ. 3d Amer. ed. Tr. and ed. by W. H. GREENE. Philadelphia, Lippincott. 12°.

THE appearance of the third American edition of this well-known and excellent text-book bears witness to its popularity. The present edition is based upon the fifth French edition, and is brought well down to date.

Quantitative Chemical Analysis by Electrolysis. According to original methods, by DR. ALEXANDER CLASSEN. Tr. by WILLIAM H. HERRICK. New York, Wiley. 8°.

It is perhaps not unnatural that an author who is also an investigator should attribute to methods of his own finding greater importance than he is inclined to yield to the devices of others. Upon some such presumption only does it seem possible to explain the presence of the phrase 'according to original methods' upon the titlepage of Professor Classen's book. Scarcely more than half the fundamental methods of electrolytical analysis which are described or referred to are the author's own; and even in the schemes for the separation of elements, and in the special applications, where the original methods are employed to the utmost possible extent (and sometimes, it is to be feared, to the exclusion of more suitable ones), recourse has been had in fully a fourth of the cases discussed to the processes of others. For many years a few electrolytical methods have held high rank, and justly, among precise analytical processes, and recently the number of such has increased. To note that these are recognized (though too scantily) in the text, if not on the titlepage, is gratifying. Professor Classen has rendered great and undoubted service to analytical chemistry in arousing and directing attention to the uses of electricity in chemical analysis; but stress of severe experience (to detail which would be out of place here) compels the suggestion with reference to some, at least, of the 'original methods' that, before applying them in work demanding close accuracy of results, to scrutinize carefully and test by experiment is the part of wisdom.

Elementary Trigonometry. By T. ROACH. Oxford, Clarendon Pr. 12°.

THIS work on elementary trigonometry is the result of many years' experience in teaching the subject, both as assistant master in Repton School and as a private tutor. The book-work is divided into short portions, and at the end of each portion is introduced a set of examples illustrating the point just taught. The total number of examples in the text is more than a thousand, and to these is added a graduated collection of two hundred miscellaneous questions. The author expresses a hope to include a collection of more difficult questions on the same part of the subject in a subsequent work on higher trigonometry. At the end of the book is given a collection of papers recently set in some of the principal examinations in England, in which a knowledge of elementary trigonometry is required.

NOTES AND NEWS.

THE interior department of Canada has received advices from the exploratory survey party sent to northern British Columbia, near the Alaska boundary-line. Dr. Dawson, who is in charge, will return to Ottawa before winter sets in. The other section of the expedition, under the direction of Mr. Ogilvie, has been gathering general information regarding the country, and making a general survey. Considerable data have been gathered regarding the disputed boundary-line between the Dominion and Alaska. This, when completed, will be transmitted to Ottawa, when diplomacy will settle the boundary question. Mr. Ogilvie proposed to winter near Fort Reliance, a point about one thousand miles north of Victoria. After obtaining more men, he will endeavor to penetrate across country as far north as the mouth of the Mackenzie. His proposal to increase his party is simply a precautionary measure, as he was informed that the Eskimos on the Arctic slopes are very troublesome. He will start for home by another route, ascending the Mackenzie River, and entering civilization in the North-west Territory. He expects to reach Ottawa next fall.

— The Canadian Government is making an effort to settle the troubles at Metlakahtla, which were mentioned in the last number of *Science*. Mr. A. Vankoughnet, deputy minister of Indian affairs, left on Oct. 4 for British Columbia. He has been intrusted with the task of investigating the troubles among the Metlakahtla Indians, who are removing to Alaska. Bishop Sillitoe of New Westminster, British Columbia, has for the past week been the guest of Sir John A. Macdonald, the Canadian premier. It is understood that he visited Ottawa specially to urge the government to back down with the hope of persuading the Indians to remain on British soil.

— The Nautical Society of Hamburg has offered a prize of 500 marks for the best essay on the subject of calming the sea by the use of oil. An exhaustive description of experiments of the effect of oil made up to the present time is required; also a criticism of the arrangements used so far, and especially complete directions for its use by large steamers and sailing-vessels, as well as small vessels, — pilot, fishing, and life-saving boats, — besides directions for the use of oil at sea and near the coast. The essays are to be written in English or German, and sent before Nov. 1, 1887, to the president of the Nautical Society, director of the Navigation School, Capt. F. E. Matthiesen, Hamburg. Competition is not limited by nationality.

— According to *Nature*, the Syndics of the Cambridge University Press will publish early in October two works on elementary chemistry. One, intended as a companion to lecture-work, is by Mr. Pattison Muir and Dr. Charles Slater: the other, intended to be used along with the book already mentioned, is a course of laboratory work by Mr. Pattison Muir and Mr. Carnegie. Both books deal with the subject of elementary chemistry in a manner somewhat different from that usually adopted in text-books.

— Bulletin No. 35 of the United States Geological Survey, on the physical properties of the iron carburets, by Carl Barus and Vincent Strouhal, is a continuation of the work published in Nos. 14 and 27, and the investigation is still incomplete. This contribution is devoted to the internal structure of tempered steel, and the color-effect produced by slow oxidation of iron carburets. Bulletin No. 36, on the subsidence of fine solid particles in liquids, by Carl Barus, has a more obvious bearing on the proper work of the Geological Survey, since this and kindred investigations have already thrown much light upon the process of sedimentation.

— The 'Digest of the International Law of the United States,' which has been prepared by Dr. Francis Wharton and issued from the government printing-office in three volumes, is a splendid work. The able editor has brought together a most valuable collection of material, and arranged it in excellent order. This work will long remain our standard reference-book on topics of international law.

— The number of steamers existing in the world last year is estimated, says the *Journal of the Society of Arts*, at 9,969, of an aggregate burthen of 10,531,843 tons. The corresponding number of steamers existing in the world in 1885 was estimated at 9,642, of an aggregate burthen of 10,291,241 tons. The total of 9,969 steamers, representing the world's steam-shipping in 1886, was made up as follows: iron steamers, 8,198, of an aggregate burthen of 8,911,406 tons; steel steamers, 770, of an aggregate burthen of 1,206,962